

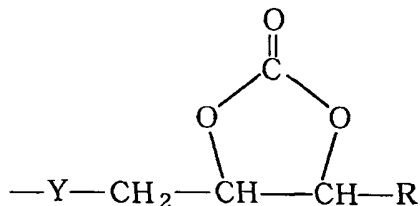
WHAT IS CLAIMED IS:

1. An electrolyte composition for batteries or electric double layer capacitors, said electrolyte composition comprising (A) a polymer component and/or (B) an oligomer component, and (C) an electrolyte component, wherein:

said polymer component (A) is (A-1) a (co)polymer containing at least one cyclocarbonato group represented by the below-described formula (1), obtained by reacting carbon dioxide with a (co)polymer, which contains at least one epoxy group, and/or (A-2) a (co)polymer obtained by (co)polymerizing a monomer containing at least one cyclocarbonato group represented by the below-described formula (1), which has been obtained by reacting carbon dioxide with a monomer containing at least one epoxy group, and

said oligomer component (B) is an oligomer containing two or more cyclocarbonato groups represented by the below-described formula (1), obtained by reacting carbon dioxide with an oligomer, which contains two or more epoxy groups in a molecule.

Formula (1)

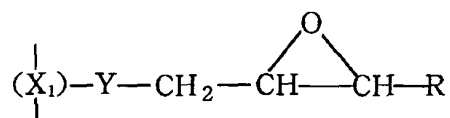


wherein Y represents a connecting group to the backbone of the

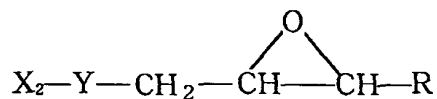
corresponding (co)polymer (A-1) or (A-2), and R represents a hydrogen atom or an alkyl group having 1 to 3 carbon atoms.

2. An electrolyte composition according to claim 1, wherein said (co)polymer (A-1) is a (co)polymer obtained by reacting carbon dioxide with a (co)polymer which contains at least one recurring unit represented by the below-described formula (2), and said (co)polymer (A-2) is a (co)polymer of a monomer obtained by reacting carbon dioxide with a monomer represented by the below-described formula (3).

10 Formula (2)



Formula (3)



wherein X_1 represents a polymerization residual group of an α, β -unsaturated carboxylic acid, X_2 represents a reaction residual group of an α, β -unsaturated carboxylic acid, Y represents a connecting group, and R represents a hydrogen atom or an alkyl group having 1 to 3 carbon atoms.

3. An electrolyte composition according to claim 2, wherein each of said α, β -unsaturated carboxylic acids is at least one α, β -unsaturated carboxylic acid selected from the group

consisting of acrylic acid, methacrylic acid, crotonic acid, maleic acid, fumaric acid and itaconic acid.

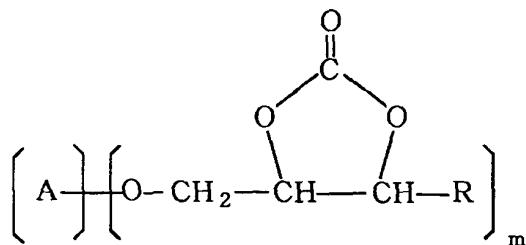
4. An electrolyte composition according to claim 1, wherein said (co)polymer containing at least one epoxy group
5 is a homopolymer of glycidyl methacrylate or a copolymer of glycidyl methacrylate and another one or more monomer(s).

5. An electrolyte composition according to claim 1, wherein said polymer component (A) is a noncrosslinked (co)polymer and/or a crosslinked (co)polymer.

10 6. An electrolyte composition according to claim 1, wherein said oligomer containing two or more epoxy groups in a molecule is at least one polyepoxide selected from the group consisting of polyhydric alcohols (number of OH groups: 2 to 10), polyalkylene glycols (carbon number of alkylene groups:
15 3 to 6, polymerization degree: 2 to 22), polyphenols (number of OH groups: 2 to 10) and polycarboxylic acids (number of COOH groups: 2 to 4).

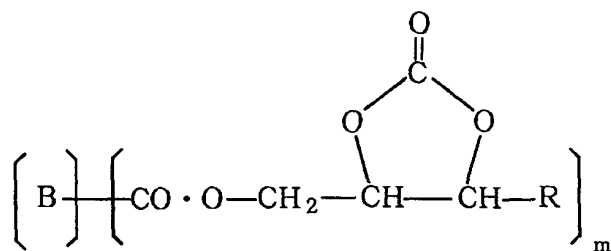
7. An electrolyte composition according to claim 1, wherein said oligomer component (B) is a compound represented
20 by any one of the following formulas (5) to (7):

Formula (5)



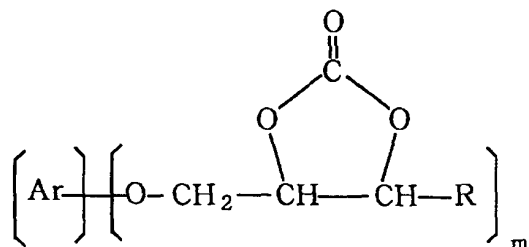
wherein A represents a residual group of a polyhydric alcohol or glycol, m stands for a numerical value not smaller than 2 but not greater than a number of hydroxyl groups in said polyhydric alcohol or glycol, and R represents a hydrogen atom or an alkyl group having 1 to 3 carbon atoms.

Formula (6)



wherein B represents a residual group of a polycarboxylic acid, m stands for a numerical value not smaller than 2 but not greater than a number of carboxyl groups in said polycarboxylic acid, and R represents a hydrogen atom or an alkyl group having 1 to 3 carbon atoms.

Formula (7)



wherein Ar represents a residual group of an aromatic compound having two or more hydroxyl groups, m stands for a numerical value not smaller than 2 but not greater than a number of hydroxyl groups in said aromatic compound, and R represents a hydrogen

atom or an alkyl group having 1 to 3 carbon atoms.

8. An electrolyte composition according to claim 1, wherein said electrolyte component (C) is at least one compound selected from the group consisting of compounds which form
5 lithium ions, sodium ions, potassium ions, ammonium ions or tetraalkylammonium ions.

9. An electrolyte composition according to claim 8, wherein said electrolyte component (C) is at least one compound selected from the group consisting of lithium bromide, lithium
10 iodide, lithium thiocyanate, lithium perchlorate, lithium tetrafluoroborate, lithium hexafluorophosphate, lithium trifluoromethanesulfonate, lithium bis(trifluoromethanesulfonyl)amide, tetraethylammonium perchlorate, tetraethylammonium tetrafluoroborate, and
15 tetraethylammonium hexafluorophosphate.

10. An electrolyte composition according to claim 1, further comprising at least one organic solvent selected from the group consisting of ethylene carbonate, propylene carbonate, dimethyl carbonate, diethyl carbonate, methyl ethyl carbonate,
20 vinylene carbonate, γ -butyrolactone, diphenyl carbonate and high molecular weight solvents each having one cyclocarbonato group in a molecule.

11. An electrolyte film for a battery or electric double layer capacitor, wherein said electrolyte film comprises an
25 electrolyte composition according to any one of claims 1-10.

12. An electrolyte film according to claim 11 for a battery or electric double layer capacitor, wherein said electrolyte film comprises an organic solvent and/or an oligomer component (B) and is in a wet state.

5 13. An electrolyte film according to claim 11 or 12 for a battery or electric double layer capacitor, wherein said electrolyte film is retained in shape by at least one shape-retaining material selected from a woven fabric, a nonwoven fabric, a woven and/or nonwoven, bonded fabric, or a porous
10 polyolefin film.

14. A battery or electric double layer capacitor, wherein an electrolyte composition according to any one of claims 1-10 is filled.

15 15. A battery or electric double layer capacitor, wherein an electrolyte film according to any one of claims 11-13 is placed.

16. A process for the production of a (co)polymer containing at least one cyclocarbonato group and useful in an electrolyte composition, which comprises reacting carbon dioxide with a (co)polymer containing at least one epoxy group.

20 17. A (co)polymer containing at least one cyclocarbonato group and useful in an electrolyte composition, wherein said (co)polymer has been obtained by a process according to claim 16.

25 18. A process for the production of a (co)polymer containing at least one cyclocarbonato group and useful in an

electrolyte composition, which comprises (co)polymerizing a monomer containing at least one cyclocarbonato group, obtained by reacting carbon dioxide with a monomer, which contains at least one epoxy group.

5 19. A (co) polymer containing at least one cyclocarbonato group and useful in an electrolyte composition, wherein said (co)polymer has been obtained by a process according to claim 18.

10 20. A process for the production of an oligomer containing two or more cyclocarbonato groups in a molecule and useful in an electrolyte composition, which comprises reacting carbon dioxide with an oligomer which contains two or more epoxy groups in a molecule.

15 21. An oligomer containing two or more cyclocarbonato groups in a molecule and useful in an electrolyte composition, wherein said oligomer has been obtained by a process according to claim 20.